UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/943,091	08/31/2001	Horst-Udo Hain	1454.1081	7566

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EXAMINER
ALBERTALLI, BRIAN LOUIS

ART UNIT	PAPER NUMBER
2655	

DATE MAILED: 09/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	**Applicant(s)**
Office Action Summary	09/943,091	HAIN, HORST-UDO
	Examiner	**Art Unit**	
	Brian L. Albertalli	2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 June 2005*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6 and 8-13* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6 and 11-13* is/are rejected.

7)☒ Claim(s) *8-10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1.   A request for continued examination under 37 CFR 1.114, including the fee set

forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this

application is eligible for continued examination under 37 CFR 1.114, and the fee set

forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action

has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June

15, 2005 has been entered.

Response to Arguments

2.   Applicant's arguments with respect to claims 1, 2, 12 and 13 have been

considered but are moot in view of the new ground(s) of rejection.

3.   Furthermore, with regard to the use of official notice in the rejections of claim 3, it

is noted that the applicant has not made any attempt to traverse the assertion of official

notice, therefore the well-known in the art statement is taken to be admitted prior art

(see MPEP 2144.03)

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains.
Patentability shall not be negatived by the manner in which the invention was made.

5.   Claims 1-2, 12, and 13 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Luk et al. (*Inference of Letter-Phoneme Correspondences by*

Delimiting and Dynamic Time Warping Techniques), hereinafter referred to as "Luk 1",

in view of Luk et al. (*Inference of Letter-Phoneme Correspondences with Pre-Defined*

Consonant and Vowel Patterns), hereinafter referred to as "Luk 2".

In regard to claims 1 and 12, Luk 1 discloses a method and system for assigning

phonemes to a lexicon of words using a dynamic time warping algorithm to phonetically

transcribe the words by assigning phoneme sequences to grapheme sequences of the

words (translate a word's spelling into its phonemic form, page 61, abstract, lines 1-5

and page 62, section 3, lines 1-3).

Luk 1 does not disclose correcting the assignment of graphemes to phonemes

within a word with the aid of position dependent frequencies including a frequency with

which at least one grapheme at a specific position in a grapheme group is assigned to

at least one phoneme.

Luk 2 discloses a method for correcting the assignment of graphemes to

phonemes within a word with the aid of position dependent frequencies including a

frequency with which at least one grapheme at a specific position in a grapheme group

is assigned to at least one phoneme (after an initial letter-phoneme alignment is

determined, see Fig. 1, a second pass is performed using pattern dependent

segmentations, projected segmentations in Fig. 1, to determine the most likely

alignment of the letters and phonemes according to predefined, position dependent

consonant and vowel patterns, page 203, sections 1 and 2).

It would have been obvious to one of ordinary skill in the art at the time of

invention to modify Luk 1 to correct the assignment of graphemes to phonemes with the

aid of position dependent frequencies including a frequency with which at least one

grapheme at a specific position in a grapheme group is assigned to at least one

phoneme, because correcting the assignment of graphemes to phonemes with the aid

of position dependent assignments of graphemes in a grapheme group (predefined

consonant and vowel patterns) yields a higher translation performance (more accurate

assignment of graphemes to phonemes) than without the correction, as taught by Luk 2

(page 204, section 3, 2nd paragraph, and Fig. 3).

In regard to claims 2 and 13, Luk 1 discloses a method for assigning phonemes

to graphemes producing them in a lexicon having words (grapheme sequences) and

corresponding associated phonetic transcriptions (phoneme sequences), comprising:

determining relative frequency with which the phonemes and graphemes are

assigned to on another for each assignment of phonemes and graphemes (association

indices, page 61, section 2, 1st paragraph);

creating for each word of the lexicon a two-dimensional matrix (incidence matrix),

one index of which is given by the grapheme of the word, and the second index of which

is given by the phoneme of the word (Fig. 1(b), page 62, section 2.2, 1st paragraph);

selecting the relative frequencies belonging to the respective phoneme-grapheme pair determined as entries of the matrix (the table is filled with the association indices, page 62, section 2.2, 1st paragraph);

logically combining each matrix entry with the aid of a mathematical operation with the extreme value (minimum) of the following three preceding matrix entries:

the entry for the same phoneme and the preceding grapheme in the word (page 62, section 2.2, $A(r,s) = \min\{.....\}$ equation, 3rd line, i.e. $A(r, s-1)...$);

the entry for the preceding phoneme and the same grapheme in the word (1st line in $A(r,s) = \min\{.....\}$ equation, i.e. $A(r-1, s)...$); and

the entry for the preceding phoneme and the preceding grapheme in the word (2nd line in $A(r,s) = \min\{.....\}$ equation, i.e. $A(r-1, s-1)...$);

using the first grapheme and the first phoneme as the starting point in the mathematical operation (path begins at $A(0,0)$, page 62, section 2.2, 1st paragraph), and using the modified entries of the matrix in determining the extreme values, the modified entries being respectively yielded from the mathematical operation (the sums found in the steps above);

determining which of the three preceding matrix entries was extreme to thereby determine a direction for this matrix entry (the minimum of the three possible combinations is found, i.e. $A(r,s) = \min\{...\}$);

defining the direction determined for the matrix entry staring from the matrix entry for the last phoneme and last grapheme and proceeding along a path through the matrix up to the matrix entry for the first phoneme and the first grapheme (a link for defining the

direction is stored at each determined minimum step, page 62, section 2.2, 3rd

paragraph); and

using the matrix elements along the path to define the assignment of graphemes

to phonemes of a word (the path w defines the alignment of graphemes and phonemes

for the matrix entries, page 62, section 2.2, 3rd paragraph).

Luk 1 does not disclose correcting the assignment of graphemes to phonemes

within a word with the aid of position dependent frequencies including a frequency with

which at least one grapheme at a specific position in a grapheme group is assigned to

at least one phoneme.

Luk 2 discloses a method for correcting the assignment of graphemes to

phonemes within a word with the aid of position dependent frequencies including a

frequency with which at least one grapheme at a specific position in a grapheme group

is assigned to at least one phoneme (after an initial letter-phoneme alignment is

determined, see Fig. 1, a second pass is performed using pattern dependent

segmentations, projected segmentations in Fig. 1, to determine the most likely

alignment of the letters and phonemes according to predefined, position dependent

consonant and vowel patterns, page 203, sections 1 and 2).

It would have been obvious to one of ordinary skill in the art at the time of

invention to modify Luk 1 to correct the assignment of graphemes to phonemes with the

aid of position dependent frequencies including a frequency with which at least one

grapheme at a specific position in a grapheme group is assigned to at least one

phoneme, because correcting the assignment of graphemes to phonemes with the aid

of position dependent assignments of graphemes in a grapheme group (predefined consonant and vowel patterns) yields a higher translation performance (more accurate assignment of graphemes to phonemes) than without the correction, as taught by Luk 2 (page 204, section 3, 2nd paragraph, and Fig. 3).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Luk 1, in view of Luk 2, as applied to claim 2, above, and further in view of the Applicant's admitted prior art.

In regard to claim 3, Luk 1 and Luk 1 do not disclose the relative frequencies in the first step are determined by selecting words from the lexicon in the case of which the number of the graphemes and the number of the phonemes coincide, for the selected words, the graphemes and phonemes are assigned to one another in the sequence of the specification of their graphemes and phonemes in the lexicon.

The Applicant's admitted prior art discloses that it is well known and recognized in the art that there is no need to implement dynamic time warping when two patterns are already aligned (such as when the number of graphemes and phonemes is the same).

It would have been obvious to one of ordinary skill in the art at the time of invention to further modify the combination of Luk 1 and Luk 2 so that if the number of graphemes and phonemes for the selected words coincided, the graphemes and phonemes would be assigned to each other in the sequence of specification in the

lexicon, thereby reducing processing time because the dynamic time warping method would be implemented fewer times.

6.   Claims 4, 6, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Luk 1, in view of Luk 2, and further in view of Luk et al. (*A Novel Approach to Inferring Letter-Phoneme Correspondences*) hereinafter referred to as "Luk 3".

Neither Luk 1 nor Luk 2 disclose determining the position dependent relative frequency with which at least one of the following combinations occur:

a phoneme produced by two or more graphemes

two or more phonemes produced by a grapheme

two or more graphemes assigned to a phoneme

a grapheme assigned to two or more phonemes.

Luk 3 discloses determining the relative position dependent frequency with which the following combinations occur:

a phoneme produced by two or more graphemes

two or more phonemes produced by a grapheme

two or more graphemes assigned to a phoneme

a grapheme assigned to two or more phonemes

See Fig. 3 (b), the association between graphemes (top) and phonemes (bottom), including combinations, are determined according to the corresponding association indices.

It would have been obvious to one of ordinary skill in the art at the time of invention to further modify the combination of Luk 1 and Luk 2 to determine position dependent relative frequencies in which multiple phoneme-grapheme correspondences occurred, in order to objectively evaluate whether these combinations suggested relationships between multiple phoneme-grapheme correspondences.

In regard to claim 11, neither Luk 1 nor Luk 2 disclose that if in the determination of the maximum value of the three preceding matrix entries in the matrix entry for the preceding phoneme and the preceding grapheme in the word and one of the other two entries are of equal magnitude, the matrix entry for the preceding phoneme and the preceding grapheme in the word is regarded as maximum.

Luk 3 discloses there is a strong assumption that a single letter will correspond with a single letter (page 743, 2nd column, 2nd paragraph).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to further modify the combination of Luk 1 and Luk 1 to make the assumption, in the case that the matrix entry for the preceding phoneme and the preceding grapheme in the word and one of the other two entries are of equal magnitude, the matrix entry for the preceding phoneme and the preceding grapheme in the word were regarded as maximum, in order to be consistent with the assumption of Luk 3 that one phoneme will be assigned to one grapheme and vice versa, and to minimize the incorrect assignment of multiple graphemes to a single phoneme or multiple phonemes to a single grapheme in the borderline case where the matrix entry

for the preceding phoneme and the preceding grapheme in the word and one of the

other two entries are of equal magnitude.

Allowable Subject Matter

7.   Claims 8-10 are objected to as being dependent upon a rejected base claim, but

would be allowable if rewritten in independent form including all of the limitations of the

base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject

matter:

Regarding claim 8, the prior art of record does not disclose and would not

suggest, after the assignment of graphemes to phonemes are corrected with the aid of

position dependent frequencies, including a frequency with which at least one

grapheme in a specific position in a grapheme group is assigned to a phoneme,

performing additional iterations wherein the corrected assignments are used to

recalculate the position-dependent relative frequencies to reassign graphemes to

phonemes for selected words in the lexicon. The combination of Luk 1, Luk 2, and Luk

3 discloses correcting the assignments of graphemes to phonemes in a second pass,

but do not suggest performing a third iteration to further correct the assignment of

graphemes to phonemes.

Conclusion

8.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian L. Albertalli whose telephone number is (571) 272-7616. The examiner can normally be reached on Mon - Fri, 8:00 AM - 5:30 PM, every second Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on (571) 272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BLA 9/7/05

W. R. YOUNG
PRIMARY EXAMINER